



NGS Shoreline: The Geographic Cell

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2nd Annual NOAA Nautical Cartography Open House

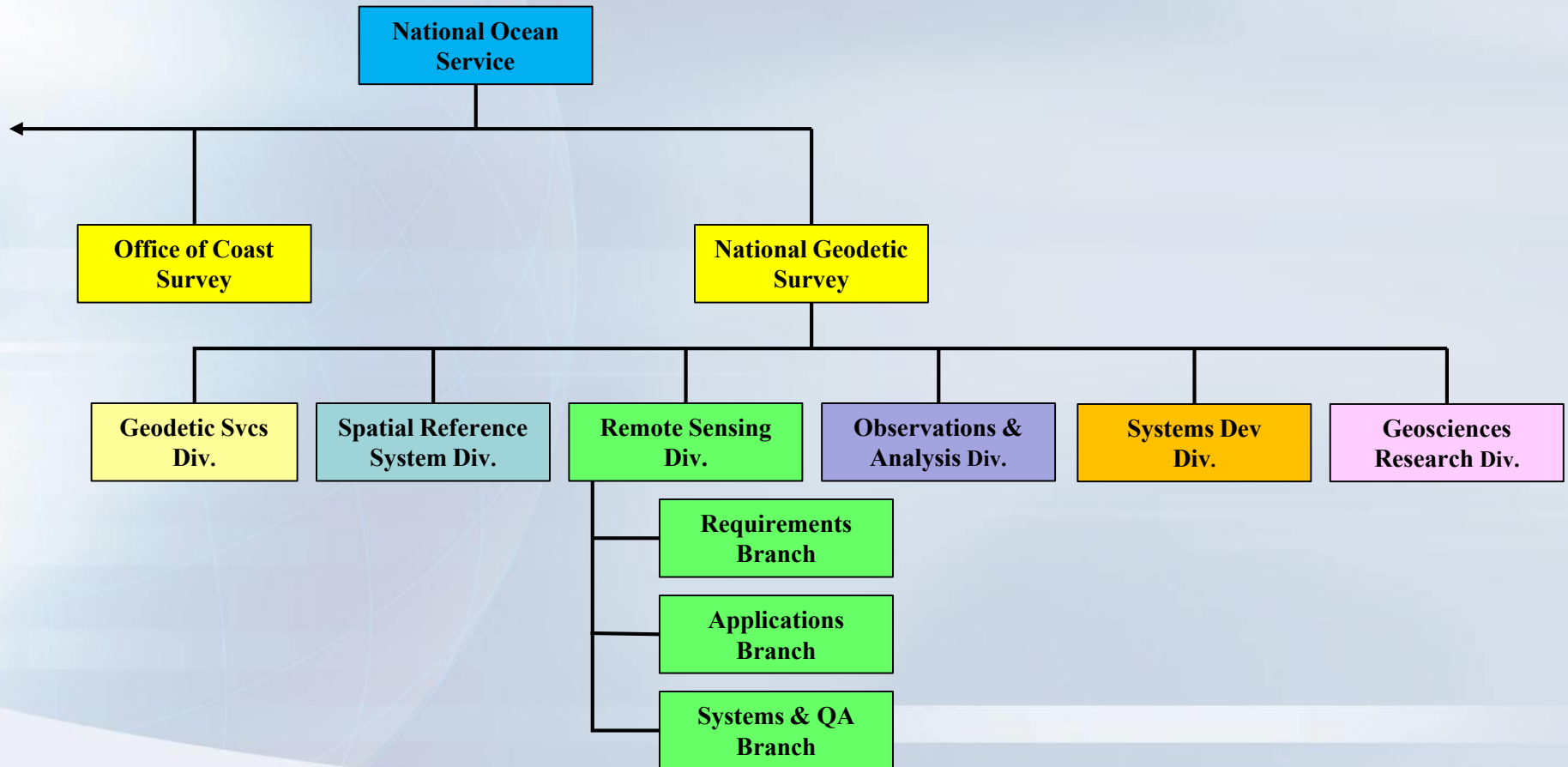
NOAA Science Center, Silver Spring, MD

July 27, 2018



National Oceanic and Atmospheric Administration

Who is NGS / RSD?



National Oceanic and Atmospheric Administration

National Shoreline

NGS's Remote Sensing Division works to produce an accurate, consistent, and up-to-date national shoreline.

Primary application:

- **NOAA nautical chart updates**

Other important applications:

- **Defining U.S. territorial limits**
- **Coastal resource management**
- **Modeling storm surge and coastal flooding**
- **GIS analysis, etc.**



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Updating Nautical Charts

The primary base mapping data for nautical charts consist of two parts:

TOPOGRAPHY + HYDROGRAPHY (+Additional Info) = NAUTICAL CHART



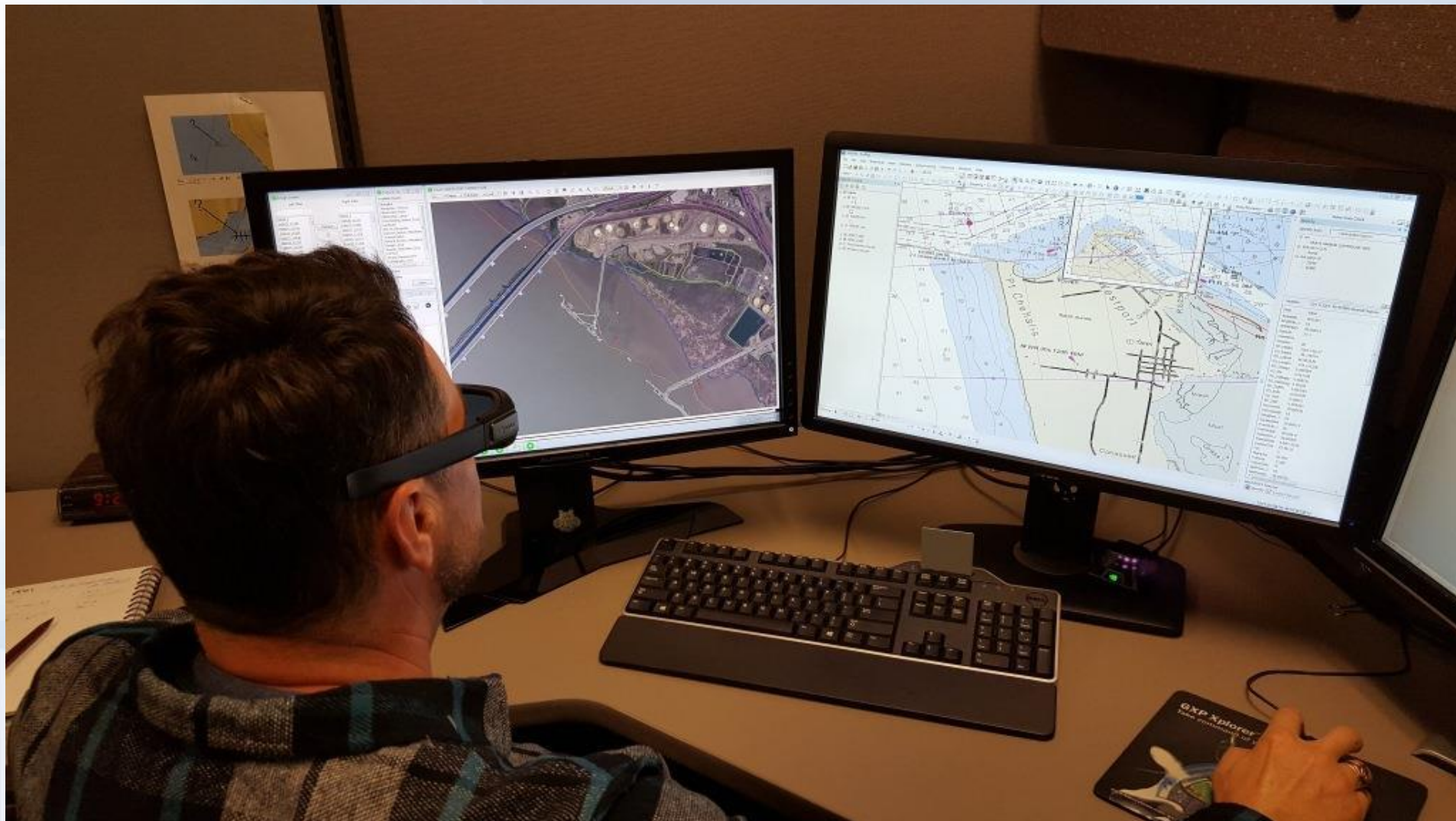
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Updating Nautical Charts

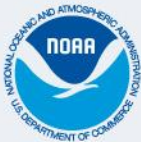
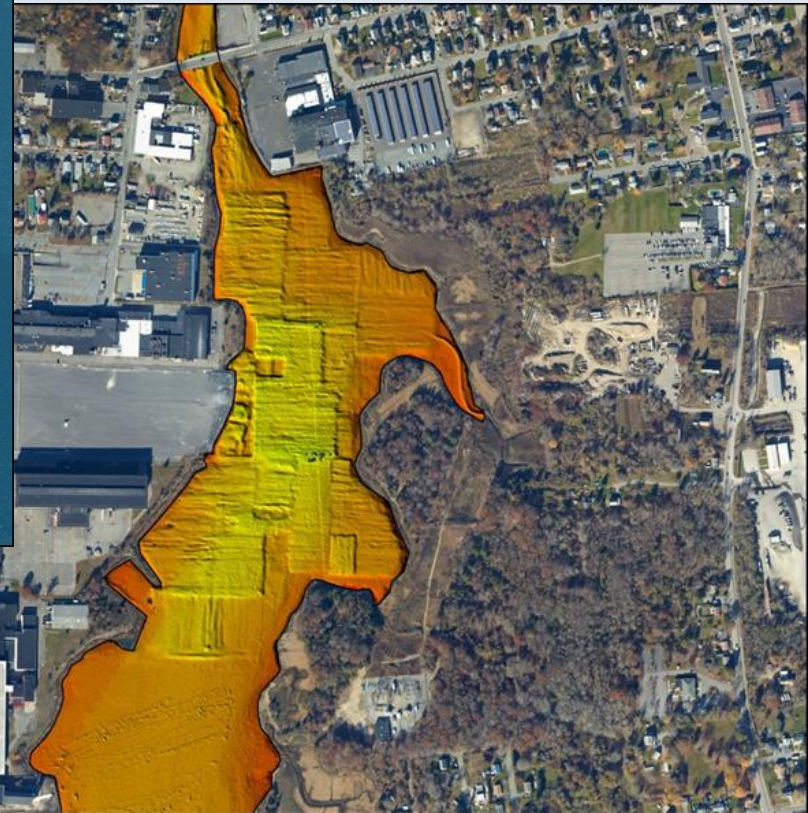
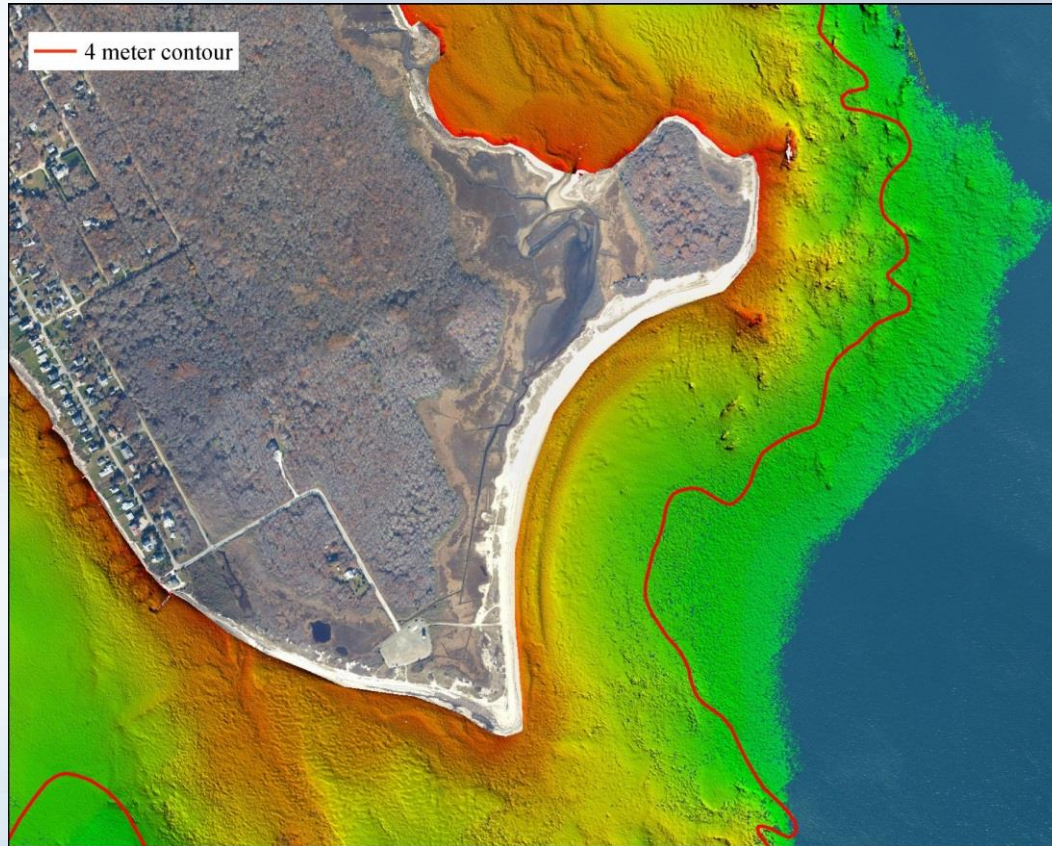
NGS Remote Sensing Division produces the topography



Softcopy photogrammetry is used to map the shoreline and nearshore features for application to nautical charts



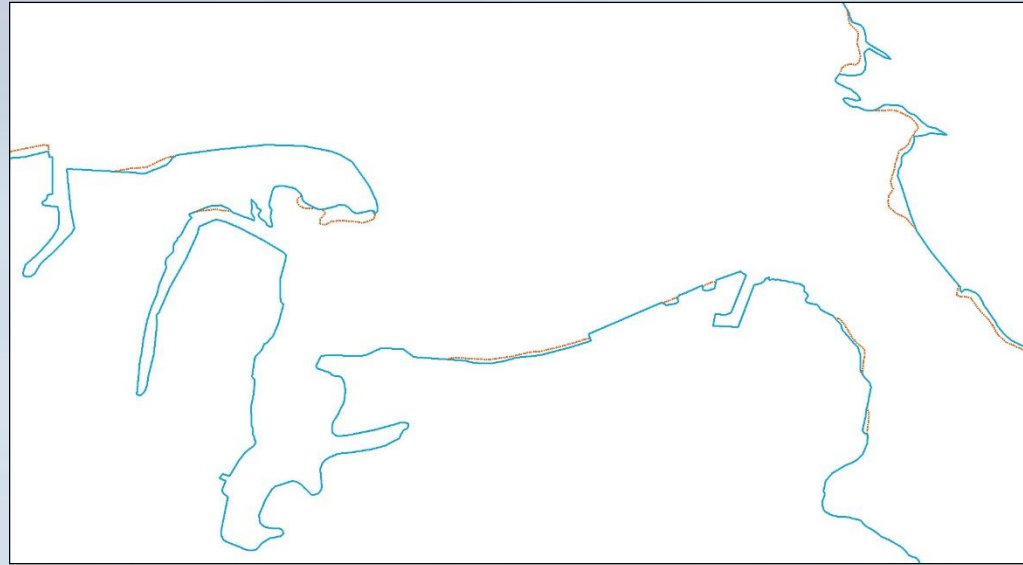
Topo-bathy Lidar derived shoreline and near-shore bathymetry to update NOAA Nautical Charts



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Typically both of these technologies, photogrammetry and topo-bathy lidar, are used together in a hybrid approach.

- The MHW and MLLW contour lines are derived from the Lidar data
- Segmented and attributed with the appropriate type of shoreline
- Edited to compilation scale
- Additional features compiled from imagery



Shoreline Data Format

The Coastal Cartographic Object Attribute Source Table (C-COAST) was developed to be compatible with our earlier digital mapping format, while allowing our data to be easily translated into IHO S-57 standard attribution used for NOAA ENC's, and to support FGDC standard metadata.

FEATURE	SOURCE_ID	DATA_SOURC	SRC_DATE	HOR_ACC	INFORM	RESOLUTION	ATTRIBUTE	CLASS	EXT_METH	EXTRACT_TE
53	GC11192	D	20130417	0.9		0	Pier.Fixed	ALONGSHORE FEATURE	S	S
50	GC11192	D	20130417	0.9		0	Marine Railway.Bare	ALONGSHORE FEATURE	S	S
50	GC11192	D	20130417	0.9		0	Marine Railway.Bare	ALONGSHORE FEATURE	S	S
51	GC11192	D	20130417	0.9		0	Marine Railway.Covers/Uncovers Or Submerged	ALONGSHORE FEATURE	S	S
51	GC11192	D	20130417	0.9		0	Marine Railway.Covers/Uncovers Or Submerged	ALONGSHORE FEATURE	S	S
154	GC11192	D	20130417	0.9		0	Pipeline.Submerged Or Surface	CULTURAL FEATURE MISCELLANEOUS	S	S
54	GC11192	D	20130417	0.9		0	Pier.Floating	ALONGSHORE FEATURE	S	S
54	GC11192	D	20130417	0.9		0	Pier.Floating	ALONGSHORE FEATURE	S	S
29	GC11192	D	20130418	0.9		0	Breakwater.Bare	ALONGSHORE FEATURE	S	S
84	GC11192	D	20130418	0.9	Mooring platform	0	Platform.Floating	OBSTRUCTION LINEAR	S	S
80	GC11192	D	20130417	0.9		0	Floating Drydock	OBSTRUCTION LINEAR	S	S
80	GC11192	D	20130417	0.9		0	Floating Drydock	OBSTRUCTION LINEAR	S	S
91	GC11192	D	20130417	0.9	Pier ruins	0	Ruins.Undetermined.Covers/Uncovers	OBSTRUCTION LINEAR	S	S
91	GC11192	D	20130417	0.9	Pier ruins	0	Ruins.Undetermined.Covers/Uncovers	OBSTRUCTION LINEAR	S	S
91	GC11192	D	20130417	0.9	Pier ruins	0	Ruins.Undetermined.Covers/Uncovers	OBSTRUCTION LINEAR	S	S
91	GC11192	D	20130417	0.9	Pier ruins	0	Ruins.Undetermined.Covers/Uncovers	OBSTRUCTION LINEAR	S	S
55	GC11192	D	20130417	0.9		0	Pier.Ruins	ALONGSHORE FEATURE	S	S
91	GC11192	D	20130417	0.9	Pier ruins	0	Ruins.Undetermined.Covers/Uncovers	OBSTRUCTION LINEAR	S	S
91	GC11192	D	20130417	0.9	Pier ruins	0	Ruins.Undetermined.Covers/Uncovers	OBSTRUCTION LINEAR	S	S
91	GC11192	D	20130417	0.9	Pier ruins	0	Ruins.Undetermined.Covers/Uncovers	OBSTRUCTION LINEAR	S	S
55	GC11192	D	20130417	0.9		0	Pier.Ruins	ALONGSHORE FEATURE	S	S
55	GC11192	D	20130417	0.9		0	Pier.Ruins	ALONGSHORE FEATURE	S	S
55	GC11192	D	20130417	0.9		0	Pier.Ruins	ALONGSHORE FEATURE	S	S
91	GC11192	D	20130417	0.9	Pier ruins	0	Ruins.Undetermined.Covers/Uncovers	OBSTRUCTION LINEAR	S	S
143	GC11192	D	20130418	0.9		0	Building	CULTURAL FEATURE MISCELLANEOUS	S	S



Landmark

Transportation
Cultural Feature
Miscellaneous

Aid To Navigation
Obstruction Linear

Alongshore Feature

Freestanding
Shoreline
Danger Area

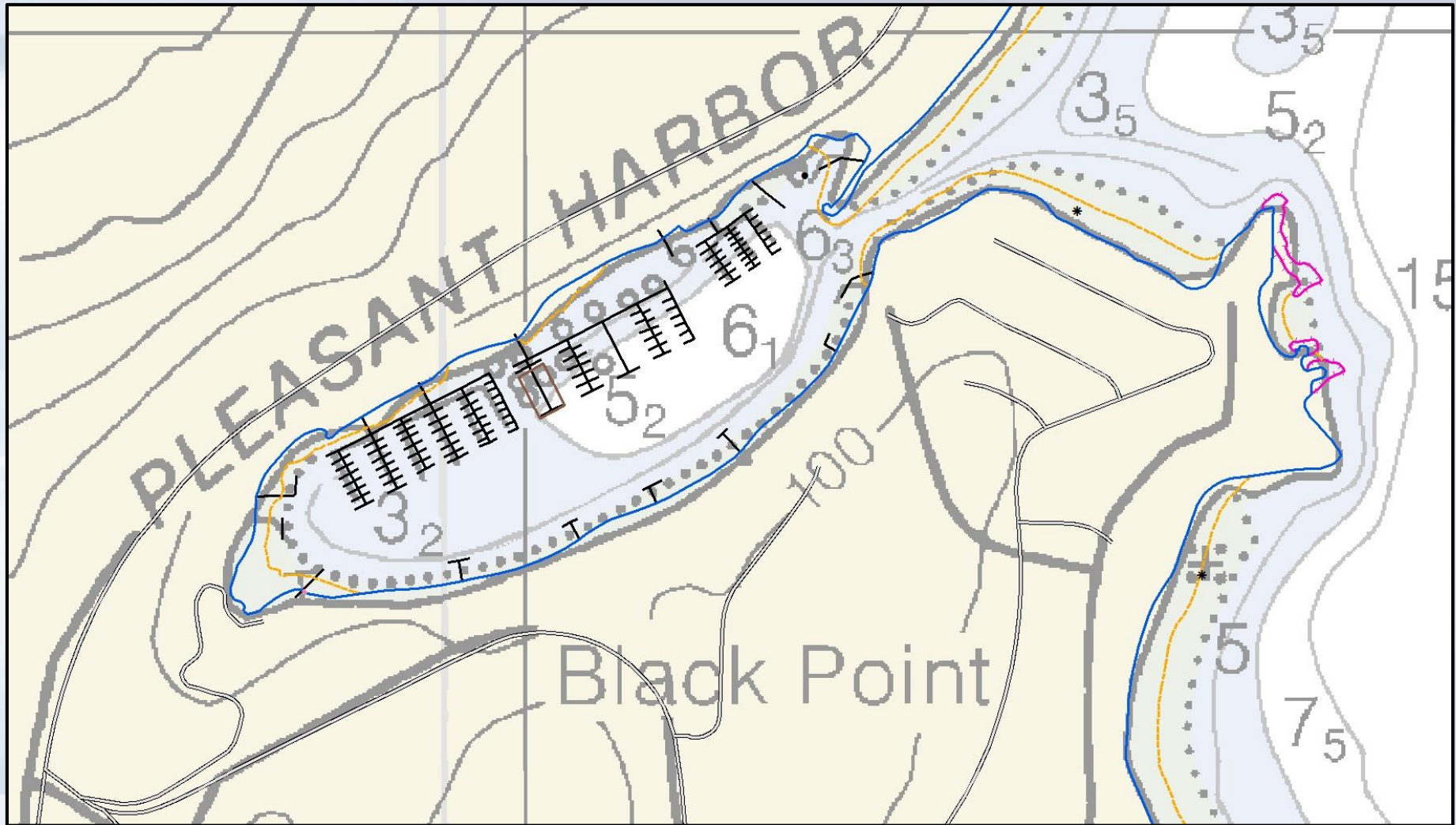
Contour

C-COAST to S-57 Translation

C-COAST CLASS / Attribute	S-57 Translation
SHORELINE	
Man-made.Bulkhead Or Sea Wall	SLCONS;catslc 10
Man-made.Bulkhead Or Sea Wall.Ruins	SLCONS;catslc 10;condtn 2
Man-made.Canal.Navigable	CANALS;catcan 1
Man-made.Canal.Non-Navigable	CANALS;catcan 2
Man-made.Drydock.Permanent	DRYDOC;status 1
Man-made.Lock	LOKBSN
Man-made.Ramp	SLCONS;catslc 12
Man-made.Rip Rap	SLCONS;catslc 8
Man-made.Slipway	SLCONS;catslc 13
Man-made.Wharf Or Quay	SLCONS;catslc 6
Man-made.Wharf Or Quay.Ruins	SLCONS;catslc 6;condtn 2
Natural.Apparent.Marsh Or Swamp	COALNE;catcoa 8;quapos 4
Natural.Apparent.Mangrove Or Cypress	COALNE;catcoa 7;quapos 4
Natural.Glacier	COALNE;catcoa 6;quapos 9
Natural.Great Lake Or Lake Or Pond	COALNE;inform Lakeshore
Natural.Mean High Water	COALNE;inform Meanhighwater
Natural.Mean High Water.Approximate	COALNE;quapos 4
Natural.River Or Stream	COALNE;inform River
Natural.River Or Stream.Approximate	COALNE;quapos 4
ALONGSHORE FEATURE	
Breakwater.Bare	SLCONS;catslc 1;watlev 2
Bridge.Fixed	BRIDGE;catbrg 1
Bridge.Footbridge	BRIDGE;catbrg 9



GC Compilation Scale

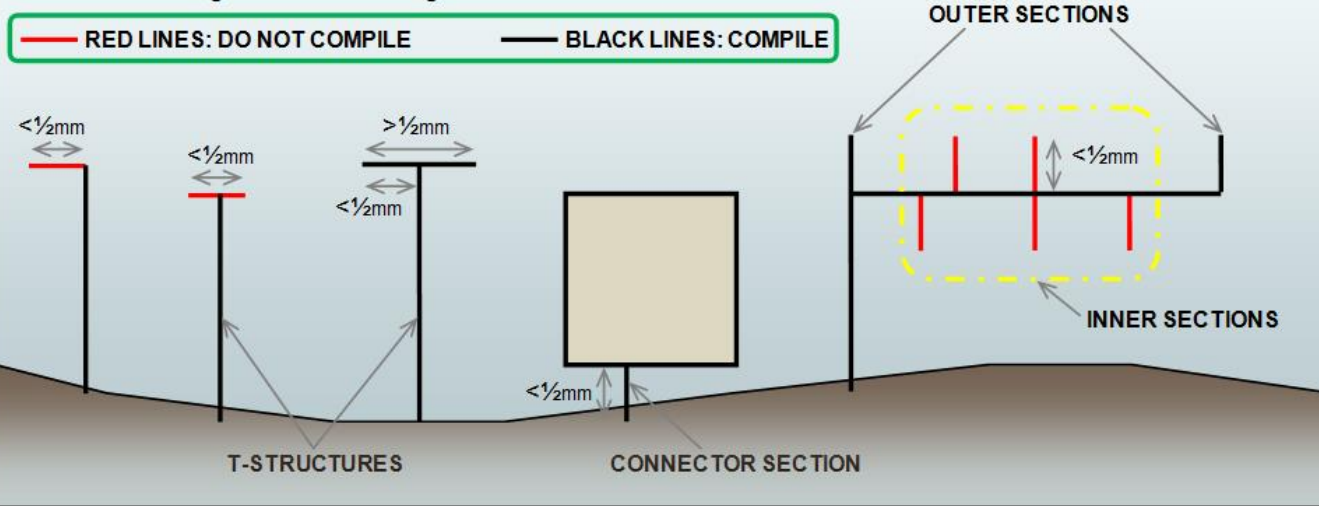


GC Scale = Chart Scale or 1:24,000
(whichever is greater)

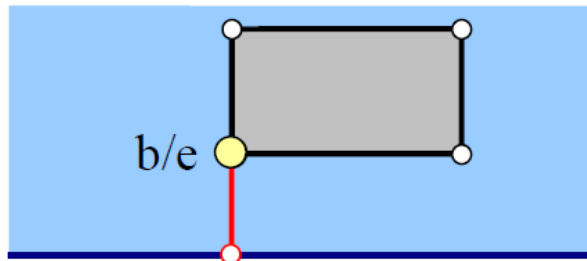
Chart: **1:40,000**
GC: **1:24,000**

GC Compilation Rules

All of these alongshore features project more than 0.5 mm from the shoreline, but contain sections that are less than 0.5 mm in length. Small connector sections shall be compiled. Small outer sections that project seaward from the main structure shall be compiled, but inner sections shall not. Small sections that are parallel to the shore shall not be compiled, except for the end of a T-structure having a combined length of both arms greater than 0.5 mm.

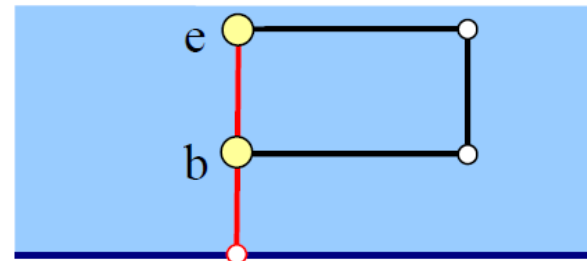


Area pier (double-line delineation)



This shows a pier in two sections, including a small linear portion (red) extending from shore and connecting to a larger section (black), which is a solid surface, more than 0.5 mm wide at the compilation scale. The larger section is compiled as one segment beginning (b) and ending (e) at the same vertex, thus representing a polygon.

Perimeter pier (single-line delineation)



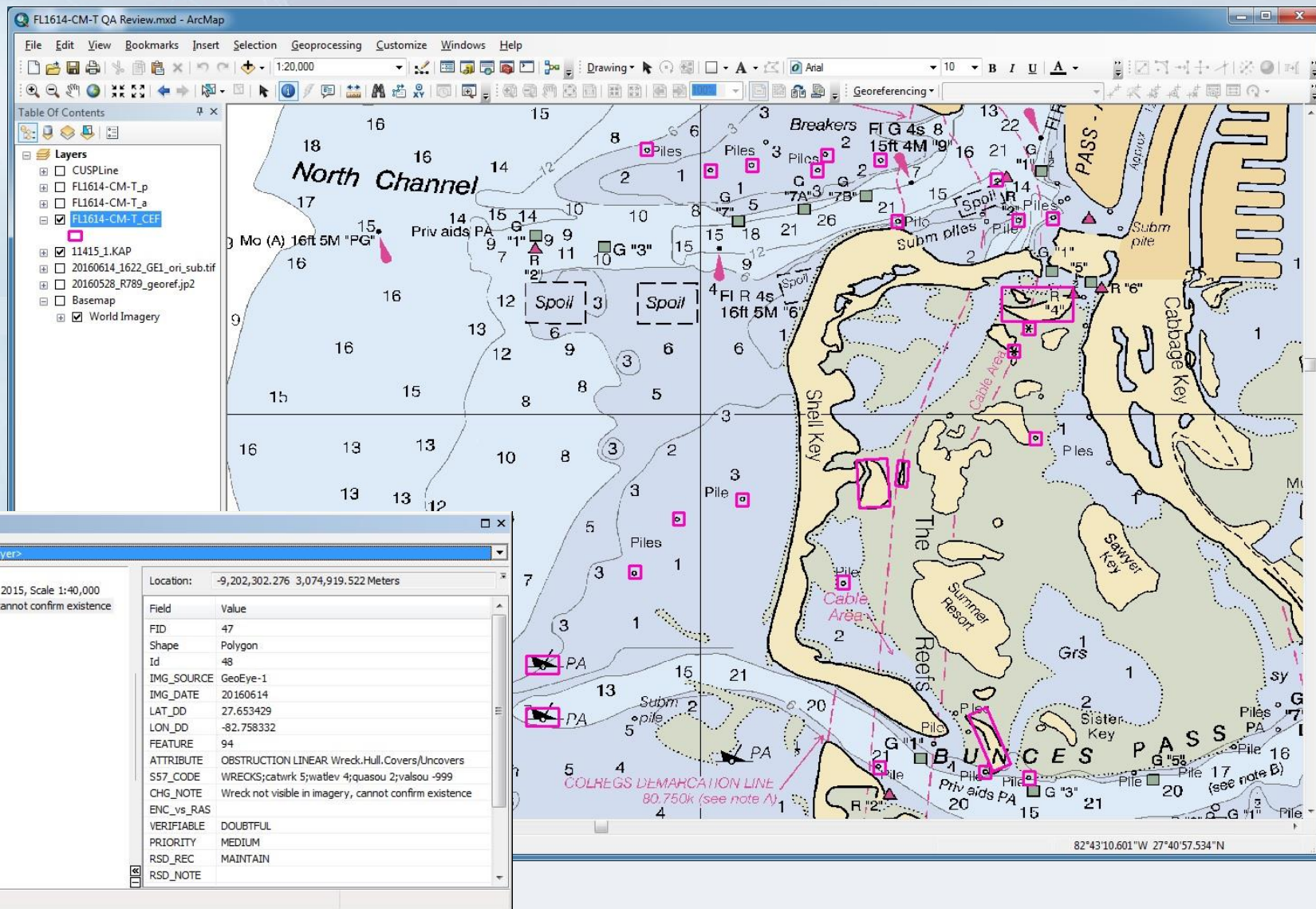
This shows another pier in two sections, although in this case *both* sections of pier surface are less than 0.5 mm wide. To ensure that the pier is properly symbolized on the chart as “open” (water in the interior) rather than a solid surface, the black segment is intentionally delineated with *separate* beginning and ending points.

GC Compilation Rules

(All units in mm.)	GC Specification
Minimum width for double-line Pier/Jetty/Breakwater/Groin	0.3
Minimum distance from shore for Pier/Jetty/Breakwater/Groin (furthest point)	0.5
Minimum separation for parallel Pier/Jetty/Breakwater/Groin (finger piers)	0.5
Minimum size of Building (longest edge)	0.5
Building less than minimum size	Do not compile, unless in water, then compile as point obstruction
Minimum size of cylindrical Tank (diameter)	0.5
Cylinder (Tank) less than minimum size	Do not compile, unless in water, then compile as point obstruction
Minimum size of Island (longest dimension)	0.5
Bare Rock (Islet) less than minimum size	Compile as Point Obstruction - Rock.Bare
Minimum size of linear obstruction (longest dimension)	0.5
Minimum distance from shore for linear obstruction (furthest point)	1.0
Minimum distance from shore for point obstruction	1.0
Minimum distance from shore for ledge (furthest point)	1.0
Minimum size of Rock/Reef that Covers/Uncovers (longest dimension)	0.5
Covers/Uncovers Rock/Reef less than minimum size	Compile as Point Obstruction - Rock.Covers/Uncovers
Minimum distance from shore for Piles/Dolphins/Stakes	0.5
Minimum separation of Piles/Dolphins/Stakes from other features	0.5
Maximum size of point Dolphin	0.5
Dolphin larger than maximum size for point feature	Compile as Shoreline - Man-made.Bulkhead Or Sea Wall
Minimum distance from shore for depth contour (furthest point)	1.0

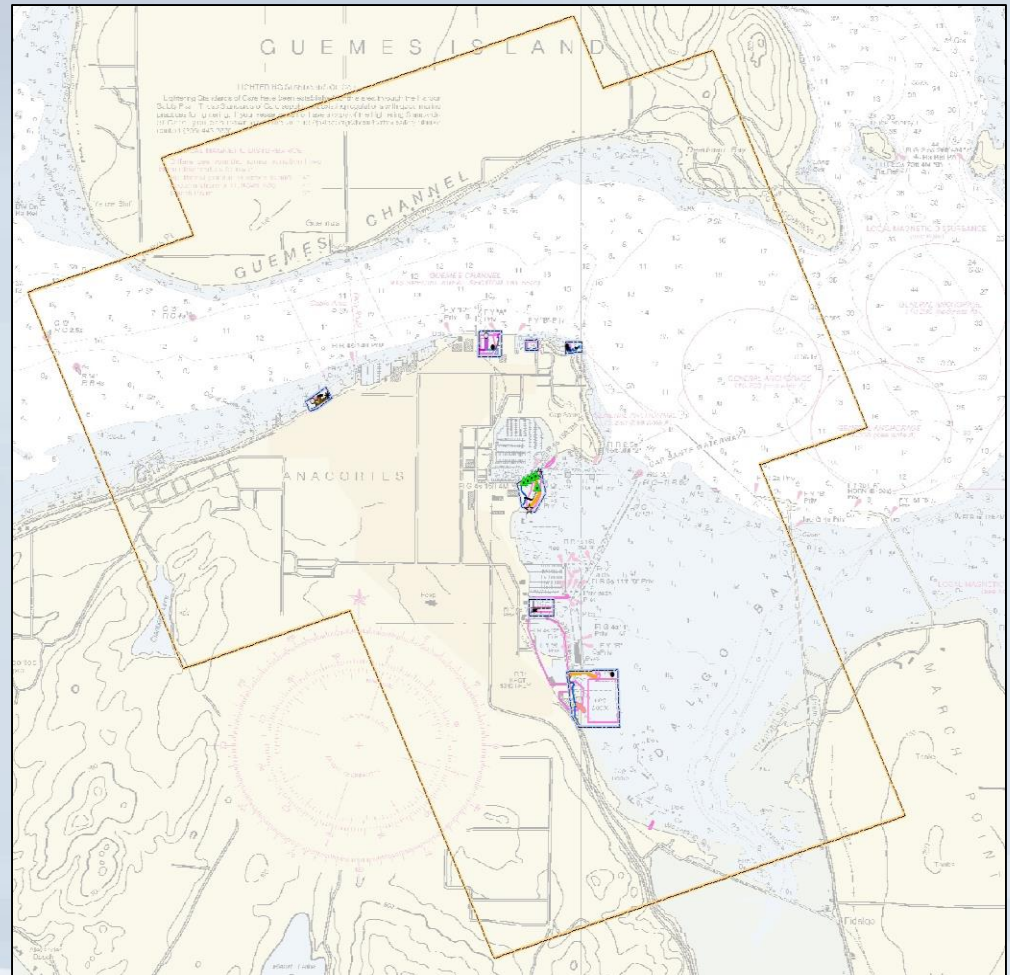


Chart Evaluation File



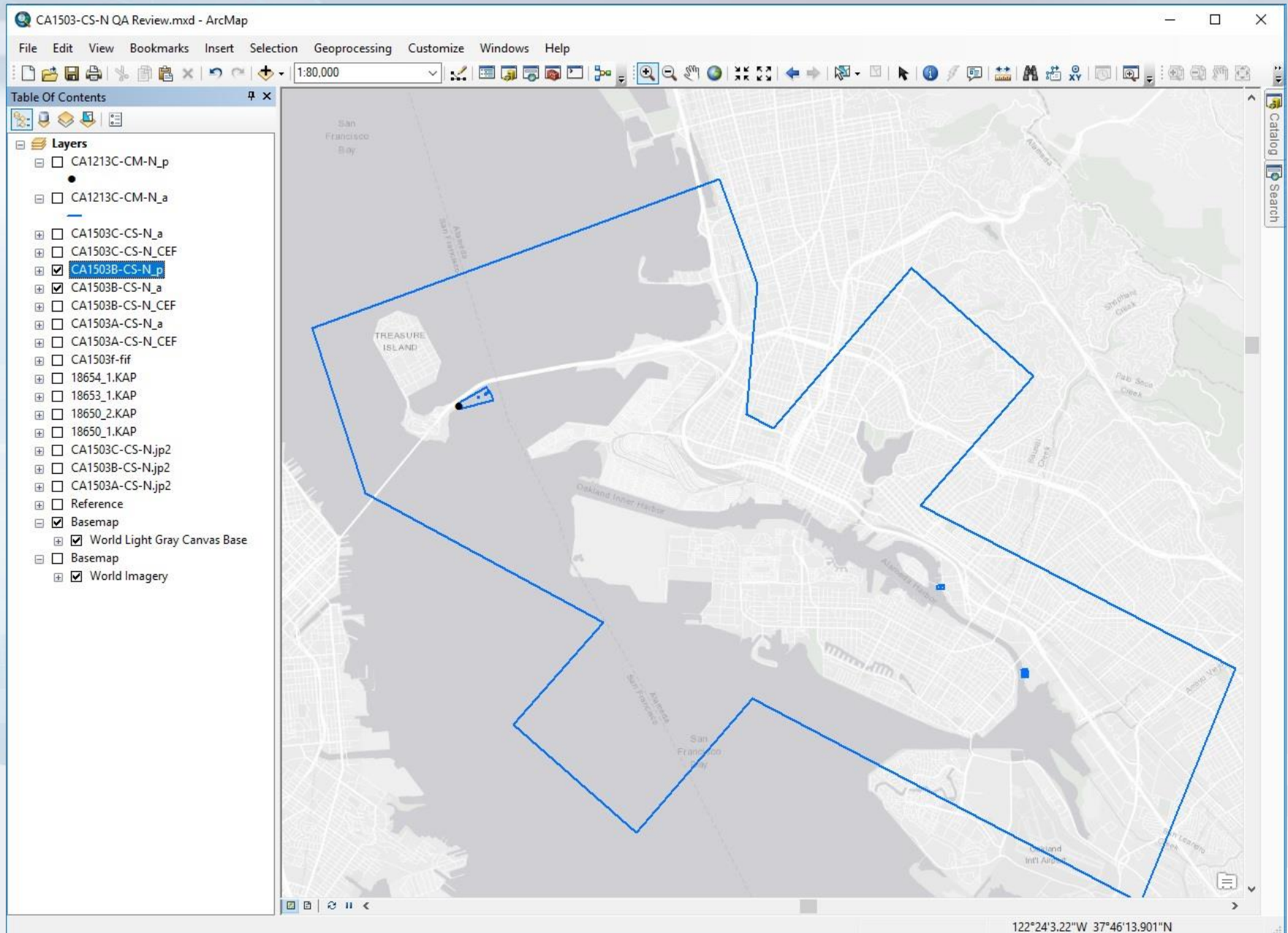
CSCAP: Coast and Shoreline Change Analysis Program

- Compare charts in priority ports to recent imagery
- Identify discrepancies
- Compile targeted updates
- Outcome: Much more frequent updates to critical port infrastructure



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Example: Full Compilation vs. Targeted Updates



Access shoreline data from the NOAA Shoreline Data Explorer

National Geodetic Survey - ... x

http://www.ngs.noaa.gov/NSDE/

noaa shoreline data explorer

NOAA Shoreline Data Explorer

National Geodetic Survey

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Layers | Search | Map Services | Metadata | Info | Disclaimer

Layers

- Vector Shoreline
 - ☒ CUSP
 - ☒ National Shoreline
 - ☐ Planned Shoreline
- Raster T-sheet
 - ☐ Raster T-sheet
- Base Map
 - ☐ Raster Nautical Charts
 - ☒ Terrain
 - ☐ Satellite

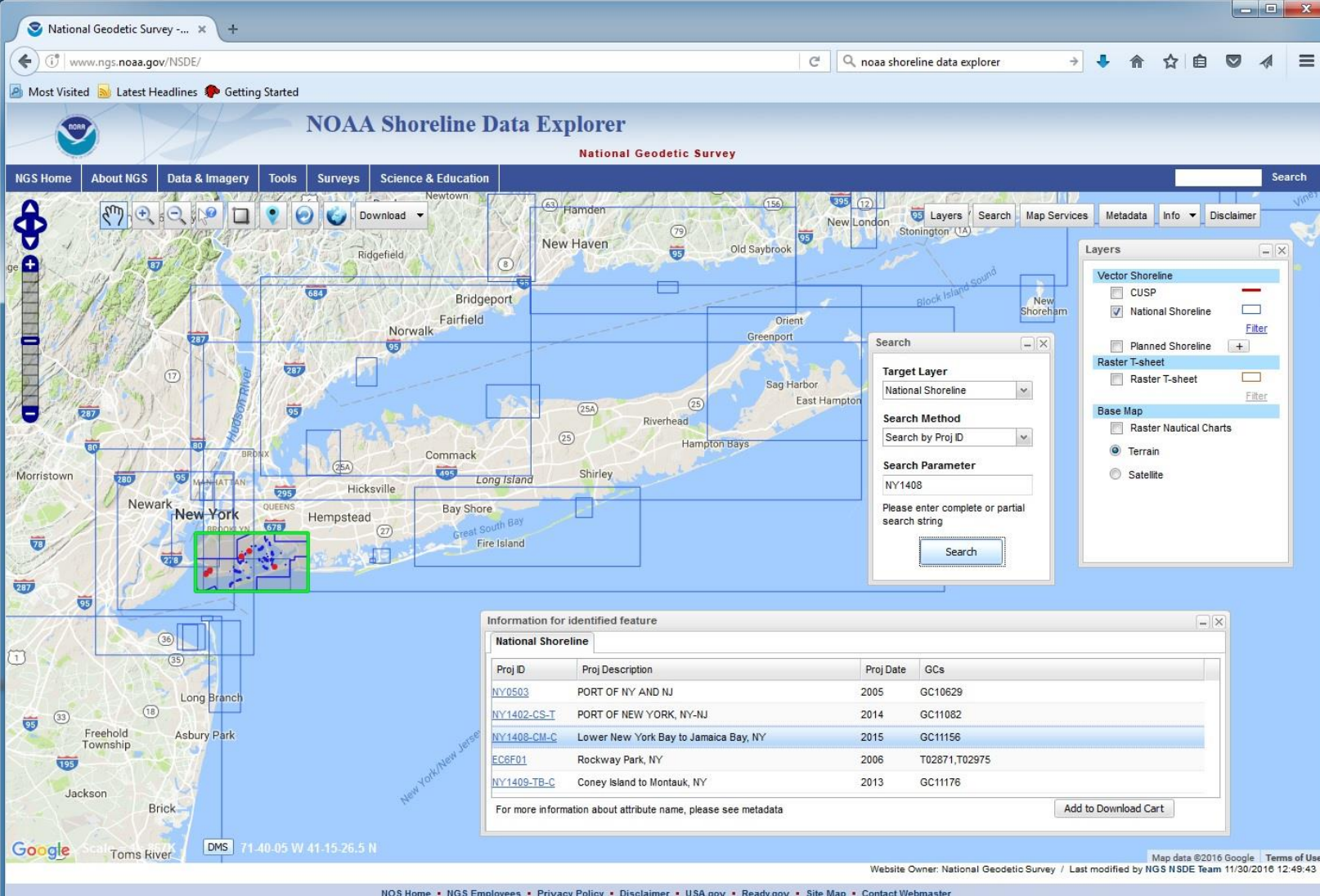
Scale = 1 : 28M DD -30.71074, 58.13960

Map data ©2016 Google, INEGI, ORION-ME Terms of Use
Website Owner: National Geodetic Survey / Last modified by NGS NSDE Team 11/30/2016 12:49:43

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NOAA Shoreline Data Explorer

Search for, select, and display National Shoreline data geographically, or by entering the Project ID or GC Number into the Search tool.



The screenshot displays the NOAA Shoreline Data Explorer web application. The interface includes a map of the New York City area with various shoreline data layers overlaid. A search box on the right allows users to find data by Project ID or GC Number. A table at the bottom displays the results for the 'National Shoreline' layer, listing Project IDs, descriptions, dates, and GC numbers.

Search

Target Layer: National Shoreline

Search Method: Search by Proj ID

Search Parameter: NY1408

Please enter complete or partial search string

Layers

- Vector Shoreline
 - ☐ CUSP
 - ☒ National Shoreline
 - ☐ Planned Shoreline
- Raster T-sheet
 - ☐ Raster T-sheet
- Base Map
 - ☐ Raster Nautical Charts
 - ☒ Terrain
 - ☐ Satellite

Information for identified feature

Proj ID	Proj Description	Proj Date	GCs
NY0503	PORT OF NY AND NJ	2005	GC10629
NY1402-CS-T	PORT OF NEW YORK, NY-NJ	2014	GC11082
NY1408-CM-C	Lower New York Bay to Jamaica Bay, NY	2015	GC11156
EC6F01	Rockway Park, NY	2006	T02871,T02975
NY1409-TB-C	Coney Island to Montauk, NY	2013	GC11176

For more information about attribute name, please see metadata

Add to Download Cart

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NOAA Shoreline Data Explorer

Once the vectors are displayed, individual features can be identified and the feature attributes are shown in the information box.

The screenshot displays the NOAA Shoreline Data Explorer web application. The browser address bar shows the URL www.ngs.noaa.gov/NSDE/. The page title is "NOAA Shoreline Data Explorer" and it is associated with the "National Geodetic Survey".

The interface includes a navigation bar with links: NGS Home, About NGS, Data & Imagery, Tools, Surveys, and Science & Education. A search bar is located on the right side of the navigation bar.

The main map area shows a satellite image of a coastal region with vector shorelines overlaid. The map is divided into a grid. A blue vector shoreline is highlighted, and its attributes are displayed in the "Information for identified feature" box at the bottom.

The "Layers" panel on the right side of the map shows the following layers:

- Vector Shoreline
 - ☐ CUSP
 - ☒ National Shoreline
 - ☐ Planned Shoreline
- Raster T-sheet
 - ☐ Raster T-sheet
- Base Map
 - ☐ Raster Nautical Charts
 - ☐ Terrain
 - ☒ Satellite

The "Information for identified feature" box at the bottom displays the following table:

SOURCE_ID	DATA_SOURCE	SRC_DATE	HOR_ACC	INFORM	RESOLUTION	ATTRIBUTE	CLASS	EXT_METH	EXTRACT_TE
GC11156	M	20140607	1.1	None	0	Natural Apparent Marsh Or Swamp	SHORELINE	M	S

The "Natural Apparent Marsh Or Swamp" attribute is highlighted in a yellow box.

The bottom of the page includes a Google logo, a scale of 1 : 108K, and coordinates: DMS 73-48-44.8 W 40-33-23.5 N. The footer also contains the website owner information: "Website Owner: National Geodetic Survey / Last modified by NGS NSDE Team 11/30/2016 12:49:43".

NOAA Shoreline Data Explorer

Up to five projects can be added to the Download Cart.

The image shows two overlapping windows. The background window is WinZip Enterprise, displaying a folder named 'ME1301C-CM-N' containing 13 items: 'ME1301C-CM-N_metadata.htm' (HTML Document), 'projbnd.dbf' (DBF File), 'projbnd.prj' (PRJ File), 'projbnd.shp' (SHP File), 'projbnd.shx' (SHX File), 'softcopy1.dbf' (DBF File), 'softcopy1.prj' (PRJ File), 'softcopy1.shp' (SHP File), 'softcopy1.shx' (SHX File), 'softcopy1.dbf' (DBF File), 'softcopy1.prj' (PRJ File), 'softcopy1.shp' (SHP File), and 'softcopy1.shx' (SHX File). The foreground window is a web browser displaying the 'National Geodetic Survey's Vector Shoreline' page. The page includes a 'Table of Contents' with links to 'IDENTIFICATION INFORMATION', 'DATA QUALITY INFORMATION', 'SPATIAL DATA ORGANIZATION INFORMATION', 'SPATIAL REFERENCE INFORMATION', 'ENTITY AND ATTRIBUTE INFORMATION', 'DISTRIBUTION INFORMATION', and 'METADATA REFERENCE INFORMATION'. The 'IDENTIFICATION INFORMATION' section is expanded, showing 'Citation:' and 'Citation_Information:' details. The 'Citation_Information' section includes 'Originator:' (U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), National Geodetic Survey (NGS)), 'Publication_Date:' (20161110), 'Title:' (Shoreline Mapping Program of GRAND MANAN CHANNEL, HAMILTON COVE TO BOG BROOK COVE, ME, ME1301C-CM-N), 'Edition:' (Unknown), 'Geospatial_Data_Presentation_Form:' (Vector digital data), 'Publication_Information:' (Publication_Place: Silver Spring, MD), 'Publisher:' (U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), National Geodetic Survey (NGS)), and 'Other_Citation_Details:' (These vector data represent shoreline and associated data originating from current remote sensing production. The vector data files are seamless within the surveyed project area.). The 'Online_Linkage:' is provided as <http://www.ngs.noaa.gov/news/ims/shoreline/index.cfm>. The 'Larger_Work_Citation:' and 'Citation_Information:' sections are also present but empty.

National Geodetic Survey's Vector Shoreline

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- [SPATIAL REFERENCE INFORMATION](#)
- [ENTITY AND ATTRIBUTE INFORMATION](#)
- [DISTRIBUTION INFORMATION](#)
- [METADATA REFERENCE INFORMATION](#)

IDENTIFICATION INFORMATION:

Citation:

Citation_Information:

Originator:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), National Geodetic Survey (NGS)

Publication_Date: 20161110

Title: Shoreline Mapping Program of GRAND MANAN CHANNEL, HAMILTON COVE TO BOG BROOK COVE, ME, ME1301C-CM-N

Edition: Unknown

Geospatial_Data_Presentation_Form: Vector digital data

Publication_Information:

Publication_Place: Silver Spring, MD

Publisher: U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), National Geodetic Survey (NGS)

Other_Citation_Details:

These vector data represent shoreline and associated data originating from current remote sensing production. The vector data files are seamless within the surveyed project area.

Online_Linkage: <http://www.ngs.noaa.gov/news/ims/shoreline/index.cfm>

Larger_Work_Citation:

Citation_Information:

Questions?

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